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Criterion Measures of Nursing Care Quality

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
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Abstract

This study is an initial effort to measure the quality of nursing care through the assessment of patient outcome rather than by medical care process. The researchers generated and refined 539 measurement items, utilizing eight universal and 10 health deviation self-care demand categories adapted from work by D. Orem (1971). Content validity has been established for all 539 items. Pretesting and interobserver reliability testing of measurement techniques were conducted for 414 of the items. Development of an instrument for matching measurement techniques to patient populations was initiated. A manual provides detailed instructions on the use of the instrument.

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This *NCHSR Research Summary* describes research performed by Barbara J. Horn, R.N., Ph.D., and Mary Ann Swain, Ph.D., of the University of Michigan's Department of Hospital Administration, School of Public Health, under NCHSR grant HS 01649.

The complete report of this research, *Development of Criterion Measures of Nursing Care,* is offered for sale by the National Technical Information Service, Springfield, VA 22161 (tel.: 703/557-4650). Volume I is *Reliability Test Results and Instrument of Health Status Measures,* PB 267 004, and Volume II is *Manual for Instrument of Health Status Measures,* PB 267 005.

Other NCHSR reports on quality appraisal of health care are *Quality of Medical Care Assessment Using Outcome Measures,* (HRA) 77-3176, *Assessing the Quality of Long-Term Care,* (PHS) 78-3192, and *Needed Research in the Assessment and Monitoring of the Quality of Medical Care,* (PHS) 78-3219. Copies of NCHSR-published reports are available on request from NCHSR, Office of Scientific and Technical Information, room 7-44, 3700 East-West Highway, Hyattsville, MD 20782 (tel.: 301/436-8970).

Foreword

The increasing concern in public policy with cost containment in the health care delivery system in no way obviates the continued need for quality in the health care being administered. In order to cut costs effectively, information is needed on the effects on quality of care resulting from changes in health care delivery systems.

Nursing, the major contributor in the delivery of care, needs measures by which to evaluate the impact of changes in nursing roles, functions and utilization patterns. This research study supported by the National Center for Health Services Research presents outcome criteria developed as part of a new approach to assessing the effectiveness of nursing care. The measures to assess the quality of care are based upon eight universal and ten health deviation self-care demand categories. The study recognizes that outcomes, by definition, are the result of multiple determinates. Outcomes are the combined result of several converging forces: the restorative process inherent within each individual; environmental and social influences; and the contributions of participative health professions. The study also recognizes that nurses and nursing care contribute to outcomes in interaction with all other health professionals. To facilitate interdisciplinary assessment, a system is described which matches the criterion measures of nursing care to appropriate diagnoses and Hospital Index (HICDA) codes. This system will permit joint assessments involving other health professionals, a long-term need in studies of this kind.

Gerald Rosenthal, Ph.D.
Director

August 1978

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Introduction

This study addresses the issue of evaluating the quality of nursing care provided adult, medical-surgical, hospitalized patients. The increasing complexity of health care, changing societal demands for services, and the thrust to provide quality care to more people in a more efficient and more accessible manner, necessitates systematic objective evaluation of the delivery of health care services. Nursing constitutes the largest number of health professionals functioning in acute-care facilities and nurses are responsible for the patient continuously from admission to discharge. The impact of nursing care services must be measured.

Existing evaluation tools in nursing reflect measures of structure and process. Little research effort has been devoted to the development and testing of outcome measures. It is recognized that patient outcomes arise from multiple determinations. Outcomes are the combined result of several converging forces: the restorative process inherent within each individual, environment, and social influences, and the contributions of all participative health professionals (i.e., nurses, physicians, physical therapists, social workers). Nevertheless, a method to assess nursing's impact on patients' health status is urgently needed.

The objective of the project was to develop, refine, and validate measures of the quality of nursing care. The focus was on the assessment of the outcomes of the nursing care process as reflected by the patients' health status. Measures of patients' physical and emotional status, and the extent of their knowledge and ability to perform self-care, were developed and related to universal and health deviation demands. Thereafter, the investigators sought to ascertain the reliability and validity of each of the various measurment items generated. Due to the research and developmental focus of the work, no specific hypotheses were formulated or tested. A total of 539 measurement items were developed and validated, using eight universal and 10 health deviation self-care demand categories developed by Orem *(1)*. In addition, 414 of the items were pretested to determine deviations in findings returned by different observers. This subjective variation was corrected by the development of specific observation procedures for specific patient groups. The validated measurement items and an "instrument" for matching observer techniques to particular patients were incorporated in a manual *(2)*.

Analytical and methodological procedures

A comprehensive instrument for measuring the quality of nursing care depends on specifying the domain of care for which nursing is responsible. A major difficulty from the beginning was that nursing did not have a well-defined classification system for identifiable patient care problems. Thus, it was necessary to adopt at least a rudimentary system for organizing and definding nursing care problems. Three approaches were explored; a discussion of each approach follows.

Initially, specific medical diagnoses were chosen as a heuristic device to structure our thinking about nursing care problems. Frequently occurring medical diagnoses were identified for medical-surgical hospitalized patients. Sources included Payne *(3),* the Commission of Professional and Hospital Activities (CPHA) *(4),* and The National Center for Health Statistics (NCHS) *(5).* For each medical diagnosis nursing care problems were identified, the ameliorative activities for each problem were listed, and the desired outcomes for those activities were described. Finally, those desired outcomes were translated into quantifiable measures, usually subsets of questions to ask or observations to make about patients.

It soon became obvious that the disease entity classification was too detailed and repetitious to be appropriate for nursing. That is, patients classified differently by medical diagnoses were often similar in terms of nursing problems. For example, the paraplegic rehabilitation patient and the major stroke patient who is scheduled for prolonged bedrest are both at risk in terms of skin breakdown. Respiratory criteria for patients following surgery with a general anesthetic are appropriate measures of effective nursing care whether the operation was a herniorrhaphy, cholecystectomy, hysterectomy, or a total hip repair. In each case, the criteria assess the effectiveness of deep breathing and coughing exercises.

Our second approach was to define nursing problems by focusing on the various systems of the body, e.g., respiratory, renal, and cardiovascular. Continued testing of the instrument and development of the measurement item revealed the limited usefulness of this approach. For example, within a systemic class such as "gastrointestinal," whether the patient is hospitalized for cholelithiasis which requires surgical intervention or for medical therapy alone makes considerable difference with respect to the nursing problems presented by that patient. Furthermore, it was our experience that when nurses focused on a single system they tended to ignore relevant outcomes that involved other systems. For example, outcomes related to problems of elimination were missed for patients with cardio-vascular conditions. Systemic classifications do not define mutually exclusive and exhaustive classes of patients which reflect unique sets of nursing care problems.

A third alternative, which avoids these problems, focuses on the bio-psycho-social functioning of individuals rather than on systemic problems or disease entities. Areas of healthy functioning of considerable interest to nursing include the patient's ability to take in air, food, and water; to distribute these necessities for life throughout the body; and to carry away the waste products of their utilization. In addition to general physical health, nurses are interested in those health behaviors that afford the individual a productive, meaningful life. Nurses are concerned about the person's ability to work, rest, think, play, and love.

An organizing framework defining more carefully these outcomes has been derived from earlier work by Dorothea Orem (1971). This model is based upon the premise that the special concern of nursing is, "man's need for self-care action and the provision and management of it on a continuous basis in order to sustain life and health, recover from disease or injury, and cope with their effects." *(1)* Self-care, the ability to do activities of normal living, consists of two kinds, universal and health deviation. Universal self-care includes all demands necessary for activities of daily living. Health deviation self-care demands arise in the event of illness, injury or disease. For evaluating nursing care, the patient's health status was measured along dimensions related to these requirements for self-care.

Nine categories of health status dimensions were developed from Orem's description of self-care requirements related to air; water/fluid intake; food; elimination of body wastes; rest/activity/sleep; solitude, social interaction and productive work; protection from hazards; normality; and health deviation. These nine aspects of health provided the necessary framework for organizing nursing care outcomes. For further specificity in defining the domain of nursing care, each of the categories of health status was subdivided into four areas: I. Evidence that the requirement is met; II. Evidence that the person has the necessary knowledge to meet the requirement; III. Evidence that the person has the necessary skills and performance abilities to meet the requirement; and IV. Evidence that the person has the necessary motivation to meet the requirement.

This nine-by-four framework for describing the scope of nursing's responsibility was a valuable heuristic device for the generation of patient outcome variables. The nurse staff selected seven of the nine categories for initial focus (air, water, food, elimination, rest/activity/sleep, normality of skin, and health deviation) and proceeded to list all the variables indicated by the domains I-IV for each category. For example, variables were generated that would demonstrate the degree to which the patient's universal demand for air has been met (domain I), the adequacy of knowledge necessary to meet his/her need for air following hospitalization (domain II), and his/her ability and motivation to effectively manage self-care related to getting air (domains III and IV). Normal or optimum levels of achievement were also described for each variable generated. In the health deviation category, ten subsets of dimensions associated with health deviation and related therapies were generated (I.V and wound observations, knowledge of health deviation, medication knowledge and injection performance, knowledge of diet, fluids, exercises, activity restrictions, recommended rest, special appliances, and skin-wound care). (Table 1.)

Validation procedures. Two criteria for content validity have been proposed by Nunnally and Durham *(7)*. These criteria are that the measures should be representative of the domain to be covered, and that the design of the measures should use "sensible methods" of construction. In order to establish content validity, three groups reviewed the variables and advised on the completeness and appropriateness of their content with regard to nursing. These groups also advised on the reasonableness of suggested measurement techniques.

First, the lists of variables generated for each of the areas of health status were reviewed by all members of the research staff. Specific variables were judged as appropriate or inappropriate by collective opinion as to whether or not a particular variable was a reflection of nursing activities. Lists of appropriate variables were submitted to the National Advisory Panel, and evaluated by the following two criteria: (1) the relative completeness of the listings, and (2) the degree to which each variable could be considered an index of the efficacy of nursing activities. Once variables were evaluated in this manner, the National Advisory Panel was asked to rank the variables, using professional judgment, and to weight the relative appropriateness of the variable as an index of nursing care, to advise on the possibilities of devising measurements for the variable, and to determine the significance of a healthy outcome for patients with respect to that particular variable. Following the meeting with the Advisory Panel, variable lists were revised. The third step in establishing content validity for each variable was to ask Clinical Nurse Specialists practicing in acute care settings to evaluate the completeness of each of the variable lists, to judge the appropriateness of each variable as an index of nursing care, and to rank the variables using the same criteria as those employed by the Advisory Panel. The final lists of revised variables and their rankings are listed in the Manual, Appendix III, for each category.

Measurement techniques were then sought or developed by project staff for only those variables which were valued as having content validity and a high to moderate sensitivity to nursing care quality. Almost all of these variables fell within domains I-III. See Table 1 for the numbers of measurement items in each category and domain. These measurement techniques compose the current instrument. Data collection was designed to use the patient as the primary source of data, so direct physical observations and interviews are the most common types of measurement techniques developed. The measures were designed so that staff nurses could readily be trained to do the observations—interviews, and so that the equipment required would be available in most hospitals or could be obtained without great expense.

The remaining three categories of health status variables (solitude and social interaction, protection from hazards, and the remainder of normality) were generated as well, and initial evaluation of their validity was begun with Clinical Nurse Specialists. Many of these variables are concerned with measurement of emotional or affective states. Valid and reliable measurement techniques for affective variables, such as the Gottschalk Clinical Rating Scale of Anxiety and the Word Adjective Checklist, have been documented in the psychology and social psychology literature. These techniques are appropriate for hospitalized patients who experience difficult adjustments to their health problems. Such measurement techniques can be incorporated into the existing instrument (see *(6),* Appendix III).

Inter-observer reliability procedures

Nurse staff members were used to establish inter-observer reliability for each measurement item. Pairs of nurse staff members were randomly assigned to measure appropriate items for selected patients. A single reliability trial consisted of a pair of observers who approached a patient jointly. One randomly chosen member of the pair directed the interview and performed the tests indicated while the other member observed. For physical examination items, each observer performed the necessary observations and recorded the results. In all trials both observers recorded their observations and scored patient responses independently. These records were returned to a third party who compared the records and reported the results of each trial for each variable as an instance of agreement or disagreement.

The criteria for determining that the measurement technique for a particular variable was invariant over observers were: (1) a sample reliability index of at least 0.80; (2) an alpha error of 0.05; and (3) the lower bound of the 95 percent confidence interval to exclude the reliability index of 0.60.

Decisions on variables that fall below the standard. A general model for decision-making on the nature of subsequent work required when a reliability test for a variable failed appears in Figure 1. Essentially, the project staff would review the data on a variable to determine if there was a correct method of measuring the variable. If so, information from individual observers was reviewed to determine which persons may have measured variables incorrectly. It appeared reasonable to question the adequacy of the training of observers as the first possible source of unreliability. First remedies for unreliability were to reopen discussions on particular measures to retrain the observers.

When it was shown that training was not the problem, test results that failed to show inter-observer reliability argued strongly for the necessity of revising the measuring technique for a particular variable. The last node of the decision-tree then became important. Given the principle that one never has resources sufficient to accomplish all tasks to be done, we sought to maximize the utility of the total instrument by working first on those variables that described outcomes for the great-est number of patients. We decided to work only on those variables that were appropriate for at least 20 percent of the patients covered by the instrument. The remainder of the project's resources went into conducting the reliability and validity tests of those other variables. Variables that failed the reliability test and did not meet the applicability criterion stated above were set aside.

Scope of the current instrument

Validation procedures utilizing the project staff, the National Advisory Panel and the Clinical Nurse Specialists have resulted in an instrument containing 539 measurement items. Of these measurements 328 are related to the universal demands, for air (70), food (22), elimination (73), water (29), rest/activity/sleep (110), solitude and social interaction (1), and normality (23). The health deviation section of the instrument (211 measurements) describes intravenous and wound observations (28), patients' knowledge and self-care abilities relative to their health problems (13), their medications (61), therapeutic diet (23), and fluid intake (11), prescribed rehabilitative exercises (17), restrictions on physical activity (11), skin and wound care (19), the use of special appliances (15) and recommended rest (13). See *(6),* Appendix II for the instrument.

Domains I-III are quite evenly represented over the instrument. There are 198 variables in Domain I (Universal, 170 variables; Health Deviation, 28 variables). Doman II is represented by 183 variables (30 in Universal categories, 153 in Health Deviation). Doman III includes 155 variables (Universal, 125; Health Deviation, 30). Domain IV, which requires affective measures, currently has 3 variables (Table 1).

Table 2 gives an overview of the types of items in the instrument. Of the instrument items, 469 are appropriate as quality measures: 414 of these were tested for reliability; the other 55 items were revised or developed after reliability testing was completed and therefore require further tests. The remaining 70 informational items aid interpretation of the quality measures and do not require reliability tests.

Finally, we have drafted health status dimensions and levels of achievement, but not measurement techniques, in the areas of solitude-social interaction, protection from hazards, and a large portion of normality. Future research is planned to search out appropriate measures in the literature for these health status dimensions.

Validity

Content validity has been established for all 539 measurements on the basis of two criteria *(7)*: that items in the instrument be representative of the domain to be covered by that instrument, and that the design of the measures themselves utilize "sensible methods" of construction. Variables identified within the instrument were chosen because they represented physiological, psycho-motor, cognitive, or affective components of each of the areas of concern to nursing, whether related to universal demands or to demands arising from health deviation. Opinions of the quality staff about the representativeness of each variable as an indicant of the quality of nursing care were verified by two additional groups of experts, the practicing clinical specialists and the National Advisory Panel. The "reasonableness" of suggested measuring techniques was also subjected to critical confirmation by the two groups.

Validation—case examples. As reliability testing was being done, anecdotal notes about the process were recorded and cases of special interest were described. Several cases demonstrate some degree of construct validity for several of the measures.

Two such measures were in the component "air." The performance test for the health status dimension "adaptation to activity" is a measure of the patient's ability to adjust his performance of activities of daily living to his needs for oxygen. The variables measured are degrees of shortness of breath, recovery heart rates, and recovery respiratory rates. If the patient is satisfactorily adjusting his activity to his needs, his heart and respiratory rates should return to resting levels within 90 seconds after completing the activity. Most patients tested for this item had respiratory disease causing shortness of breath on exertion. Most of the patients achieved the normal recovery levels within 90 seconds, taking as many rest stops as they needed. In one case, however, a patient, who had congestive heart failure and asthma, did not rest as needed, but in fact hurried through her assigned activity, bathing at the bedside, in order to get ready for some visitors. She notably failed to meet the recovery levels at the 90-second limit. For this patient, the measures were indeed sensitive to the patient's adjustment of her activity levels.

A second measure in the "air" component deals with the patient's emotional adjustment to chronic cough and sputum production. The questions focus on the patient's solutions to any embarrassment or value conflict caused by coughing and expectoration. Overall, responses indicated that the respiratory disease patients interviewed had either adjusted to the point that they felt no embarrassment or had developed adequate solutions. In one case, however, the patient, who had restrictive lung disease and bronchitis, expressed solutions that included extensive withdrawal from social contacts and outside activities. She viewed these solutions as the only course open; yet her expression of frustration and anger indicated her lack of satisfaction with these solutions. Thus the questions have been found to elicit both positive and negative feeling states related to adaptation to a disease process.

Several cases demonstrate construct validity for performance measures in the "food" component. The measures test the patient's ability to perform activities of eating, such as mashing, cutting food, pouring and lifting and opening containers. For a patient with a 17-year history of rheumatoid arthritis, the measures demonstrated inability to mash food and some difficulty in cutting. The patient was suffering a "flare-up" of his arthritis and stated that he usually could manage these activities at home. When asked for his opinion as to whether the tests would demonstrate at discharge any problems he would have at home, he stated "yes, it certainly would." For another patient, with a diagnosis of multiple sclerosis, the measures demonstrated that the muscle weakness in his hands and arms, which had prevented him from lifting a quart container of liquid at home, had resolved to the extent that he could lift it at the time of discharge. He, too, stated that these tests were appropriate for evaluating his abilities to eat at home.

The observers have also noted that the range of motion, muscle strength, muscle endurance, and coordination measures in the Rest/Activity/Sleep component have distinguished problems with motion from those of strength, and/or coordination. The rheumatoid arthritic's coordination and strength tests were fairly normal despite a notably decreased range of motion. This was the same patient who had difficulty mashing and cutting food. Thus the tests indicated that it was primarily his more limited range of motion which was affecting his eating activity. Another patient demonstrated good strength on the muscle strength-endurance tests except in his hands and feet. The range of motion tests also showed some minor restrictions in hands and feet. After the interview, the patient told the observers that he did have some restricted motion in his hands and feet due to a past history of myasthenia gravis, information that was not pertinent to his present diagnosis and did not appear on the face sheet of the patient record. The loss of motion and strength was not large enough to significantly affect his daily activities. Thus the measures were sensitive to a relatively minor loss of function. Strength and active-passive range of motion tests corroborated, suggesting that the loss of strength had apparently allowed some minor contractures to develop.

Because all of these observations were done for purposes of establishing reliability, the measures were not necessarily obtained at the times most appropriate for evaluation of nursing care. They do, however, demonstrate that the measures are sensitive to differences in patients' health status. If obtained at appropriate times, the tests could validly indicate (for groups of similar patients) strengths and deficiencies in the care; that is, whether nurses followed procedures to prevent contractures and to maintain muscle strength, adequately prepared patients for performing daily activities at home, or assisted patients to resolve problems related to adjustment to disease.

Reliability

Of the 414 quality measures in the instrument (Table 2), 109 or 26 percent attained the stringent criteria set for reliability. That is, for those 109 measures the pairs of nurse observers showed a 0.80 index of agreement which was statistically significant at the 0.05 level; further, the confidence limits for that coefficient excluded the 0.60 index at its lower bound. An additional 31 measures were shown to meet at least two of the criteria; the index of agreement was 0.80 or better and was statistically significant at the 0.05 level. The criterion with respect to confidence bounds was not attained for 140 measures because agreement was absolute (r = 1.00) and, thus, no bounds were determinable. These 280 measures which have shown reliability cut across the scope of the instrument. For most sections of the instrument, at least some of the measures are both valid and reliable. The summary of these findings are tabulated in Table 3. Findings for the total item set are tabulated in *(6)*, Appendix I, Reliability Test Results.

One hundred and eight of the measures need further testing because inter-observer reliability was not established for these measures. Another problem arose for the remaining 26 measures. These particular measures appear to be appropriate only for a limited subset of the population, hospitalized adult patients. We were unable to find sufficient persons for whom such measures could be used, despite persistent attempts. These measures would appear to have limited utility for assessment of the quality of nursing care, since few patients would be available to determine an index of quality.

Manual

In order for others to utilize the items appropriately and to measure each item reliably, it was necessary to prepare a manual with detailed instructions on the use of the instrument.

The manual (Appendix III) *(6)* supplies information about the patient observations, interviews, scoring procedures, and other guidelines for recording accurate information about the health status of a particular patient. It also includes guidelines for deciding whether or not a particular measurement item is appropriate for patients in various diagnostic categories. The manual is intended to be useful both for training of nurse observers and also as a reference source during actual data collection periods. An overview of its development is described below.

Development of manual. As each measurement technique was designed, instructions to the observer/interviewer on how to perform the measure were developed. To aid evaluation of the observations and responses, norms or standards documented in the literature were incorporated into the manual. In those cases where documented "correct" responses were not available, examples of acceptable responses were listed. Three sections of the manual have fairly extensive lists of "correct" responses: Health Deviation Knowledge, Medications, and Special Appliances. For Health Deviation Knowledge, correct responses were detailed for H-ICDA diagnostic categories frequently occurring in several hospitals of varying size, character, and location. For the Special Appliances and Medication components, correct response lists were prepared for commonly prescribed medications and appliances.

After reliability testing was completed, the manual was revised and improved, incorporating knowledge gained from the use of the instrument in data collection. It currently includes an introduction to the instrument and its use; instructions to data collectors; guidelines for reliability testing; equipment needed; detailed descriptions of each instrument component, including the complete lists of health status dimensions generated; a guide for selection and matching of patients and appropriate measures; a discussion of interviewing techniques; and procedures for scoring responses.

Patient selection guide. The patient selection guide (Appendix B) designates the appropriate health status dimensions to measure for 90 frequently occuring H-ICDA diagnostic categories. It was generated with extensive input by clinical nurse specialists in order to determine which items would be appropriate measures of nursing care for specific patient groups. It was used extensively during reliability testing and is viewed as a substantial beginning effort to match measures to patients in a valid way to evaluate quality of nursing care. By linking H-ICDA code categories to appropriate sets of measurement items in the instrument, the matrix capitalizes on the information system already available in hospital settings. The guide can be used in various geographical locations and is amenable to computerization. It is feasible that both patient selection and production of appropriate data collection materials could be computerized as linked operations using this matrix.

Summary

The work of the project staff has yielded an instrument for measuring patients' health status along a number of dimensions under the influence of nursing care. The project staff considers all measures where the sample inter-observer reliability index was at least 0.80 ($\alpha < .05$) to be reliable. Failure to achieve the confidence limit criterion was a matter of insufficient trails to stabilize the reliability index above the 0.60 lower confidence bound. Therefore, we posit an instrument of 348 valid and reliable measures for general use in assessing the quality of nursing care based on observations of patients' health status. These measures include 280 reliable quality measures and 68 informational data items (Table 3). For the universal categories they total 248 items, and include air (53), water (23), food (15), elimination (64), rest/activity/sleep (77), solitude and social interaction (1) and normality (15). The remainder of the instrument (100 measures) relates to demands arising from health deviations. Included in this section of the instrument are observations of I.V. sites and wounds (23), measures of health deviation knowledge (5), medication knowledge (18), injection performance (14), therapeutic diet knowledge (7), knowledge of therapeutic fluids (6), knowledge of physical activity restrictions (3), use of special appliances (10), and care of the skin and wounds (4).

The measures focus on the patient as the primary source of data, and thus require skills in physical observation and interviewing techniques. This necessitates selecting or training appropriately skilled nurse-observers. Needed equipment is readily available and inexpensive.

The instrument as designed is most appropriate for research on alternative models for the delivery of nursing care services. Subsections of the instrument may be used to assess the relative efficacy of alternative nursing care interventions for particular patient problems. Selected items could be used in quality assurance programs at the discretion of the users. For any of these applications, a manual accompanies the instrument in order that others may use each of the measures reliably and effectively.

Definitions

Health—a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.[5]

Health status—condition or position with respect to health.

Health status may be viewed on a continuum, ranging from optimum health to death, and defined by the life cycle or by recuperative processes after specific illnesses or therapies/interventions.

Health status dimension—an aspect of health status; a continuum along which various levels of achievement are possible and measureable.

Specified levels of achievement along particular health status dimensions may be used as criteria for evaluating the nursing care of selected patient populations.

Norm—such a standard of achievement as represented by the median or average achievement of a large group.[8] Normal is the adjectival form.

Optimum level of achievement—that level of achievement on a health status dimension, of a person or group with a health deviation, at which the person(s) attain the closest possible approximation to health, assuming no other impairment limits the person(s) ability to achieve on the dimension.

Outcome—result, consequence. Synonym: effect.[6]

Assessment of outcomes is the evaluation of end results in terms of health and satisfaction.[7]

Reliability—the accuracy or consistency of a measuring instrument. The consistency with which an instrument yeilds similar repeated measurements of the same phenomenon.

Standard—a professionally developed or agreed upon level of attainment which is regarded as a measure of adequacy.

Validity—the degree to which a measurement has produced a "true" representation of the phenomenon being measured without the influence of other phenomena.[8]

Variable—a property that may have a number of different values.

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Figure

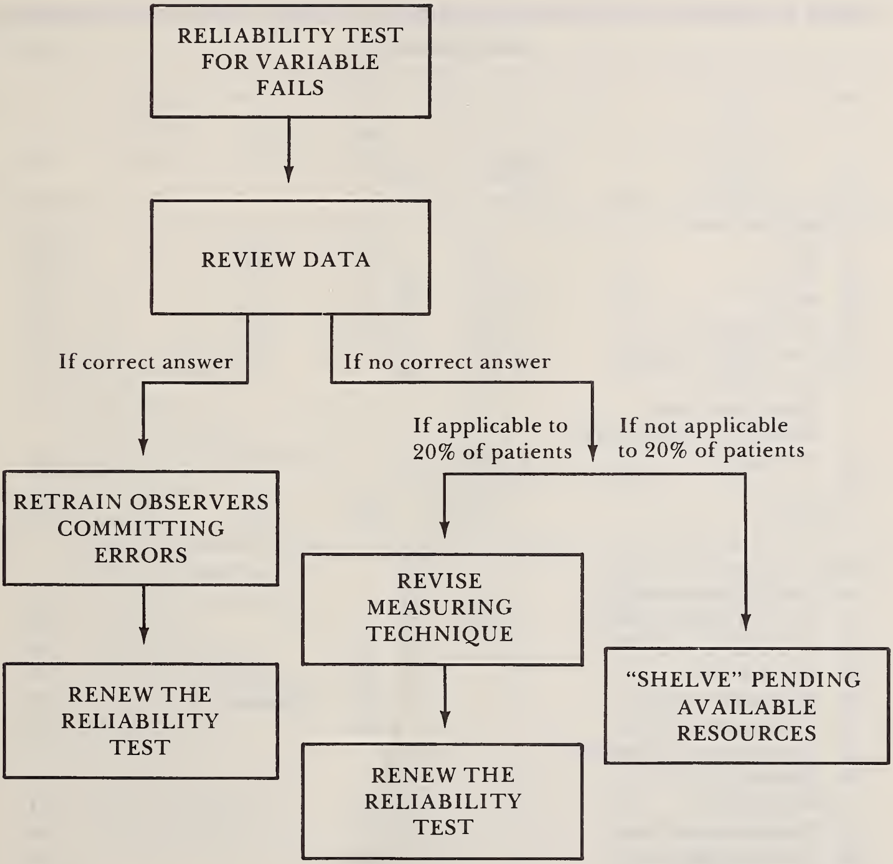
RELIABILITY TEST FOR VARIABLE FAILS
REVIEW DATA
If correct answer
If no correct answer
If applicable to 20% of patients
If not applicable to 20% of patients
RETRAIN OBSERVERS COMMITTING ERRORS
RENEW THE RELIABILITY TEST
REVISE MEASURING TECHNIQUE
RENEW THE RELIABILITY TEST
"SHELVE" PENDING AVAILABLE RESOURCES

Figure 1. Decision-tree for action following failure of reliability test for a variable

Tables

Table 1: Number of measurement items in health status categories and domains

Categories	*Total Measurement Items in Domains*				
Total	*I* *Requirements Met*	*II* *Knowledge*	*III* *Performance*	*IV* *Motivation*	*Total*
Universal Dimensions:					
1. Air	41	6	20	3	70
2. Water	19	5	5		29
3. Food	3	3	16		22
4. Elimination	16	16	41		73
5. Rest/Activity/Sleep	67		43		110
6. Solitude & Social Interaction	1				1
7. Protection from hazards					
8. Normality	23				23
Subtotal	170	30	125	3	328
Health Deviation Dimensions:					
9. Health Deviation I I.V. & Wound Observation	28				28
10. Health Deviation II		13			13
11. Medications		31	30		61
12. Therapeutic Diet		23	(Injections)		23
13. Therapeutic Fluids		11			11
14. Recommended Exercises		17			17
15. Physical Activity Restrictions		11			11
16. Recommended Rest		13			13
17. Special Appliances		15			15
18. Skin-Wound Care		19			19
Subtotal	28	153	30		211
TOTAL	198	183	155	3	539

Table 2: Type and status of measurement items in current instrument

	Quality measurement items			*Informational items*	
Component	*Tested for reliability*	*Revisions new items*	*Total*	*(Reliability tests unnecessary)*	*Total items*
Universal					
1. Air	65	2	67	3	70
2. Water	25	2	27	2	29
3. Food	15	4	19	3	22
4. Elimination	44	1	45	28	73
5. Rest/Activity/Sleep	83	4	87	23	110
6. Solitude & Social interaction	1		1		1
7. Protection from Hazards					
8. Normality	18	5	23		23
Health Deviation					
9. Health Deviation I I.V. & Wound Observation	23	5	28		28
10. Health Deviation II	12	1	13		13
11. Medications	46	12	58	3	61
12. Therapeutic Diet	20	2	22	1	23
13. Therapeutic Fluids	7	1	8	3	11
14. Recommended Exercises	13	3	16	1	17
15. Physical Activity Restrictions	6	4	10	1	11
16. Recommended Rest	10	2	12	1	13
17. Special Appliances	11	4	15		15
18. Skin-Wound Care	15	3	18	1	19
Total	414	55	469	70	539
Percent of total items	77%	10%	87%	13%	

Table 3: Summary of reliability testing on the instrument

	Number of Measurement Items Meeting Criteria					
Component	*Index=.80* *$a < .05$* *Lower bound $<.60$*	*Index=.80* *$a<.05$*	*Index= 1.00*	*Index $< .80$*	*Insufficient patients*	*Total*
Universal						
1. Air	33	6	11	15		65
2. Water	8	1	12	3	1	25
3. Food	2	1	9	3		15
4. Elimination	7		29	8		44
5. Rest/Activity/Sleep	13	9	32	29		83
6. Solitude & Social Interation			1			1
7. Protection from Hazards						
8. Normality	11		4	3		18
Health Deviation						
9. Health Deviation I I.V. & Wound Observation	13	5	5			23
10. Health Deviation II	3	2		7		12
11. Medications	11	2	16	17		46
12. Therapeutic Diet	2	2	2	13	1	20
13. Therapeutic Fluids		1	2	3	1	7
14. Recommended Exercises					13	13
15. Physical Activity Restrictions			2	4		6
16. Recommended Rest					10	10
17. Special Appliances	6		4	1		11
18. Skin-wound Care		2	11	2		15
Total Items	109	31	140	108	26	414
Percent of tested items	26%	8%	34%	26%	6%	
	Reliable 280 (68%)			Not reliable 134 (32%)		

Acknowledgments

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9. Performing Organization Name and Address University of Michigan, School of Public Health Department of Hospital Administration 109 Observatory Place, Room M2226 Ann Arbor, MI 48104	10. Project/Task/Work Unit No. --- 11. Contract/Grant No. HS 01649
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15. Supplementary Notes

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See PB 267 004 and PB 267 005 for Volumes I and II of the final report.

16. Abstracts

This study is an initial effort to measure the quality of nursing care through the assessment of patient outcome rather than by medical care process. The researchers generated and refined 539 measurement items, utilizing eight universal and 10 health deviation self-care demand categories adapted from work by D. Orem (1971). Content validity has been established for all 539 items. Pretesting and inter-observer reliability testing of measurement techniques were conducted for 414 of the items. Development of an instrument for matching measurement techniques to patient populations was initiated. A manual provides detailed instructions on the use of the instrument.

~~17. Key Words and Document Analysis. 17a. Descriptors~~

15. Supplementary Notes (continued)

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